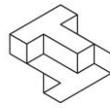


Making Emergency Kits

Lab Related Activity: *Engineering for Earthquakes*



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Students consider how people are affected by the aftermath of earthquakes and other natural disasters. They then plan emergency preparation kits for different situations and record their solutions on a poster to share with their class and display at school.

Grades 3-8 | Estimated Time: 30-60 minutes

Student Outcomes

Students will be able to explain why emergency preparation kits are useful.

Students will be able to distinguish between a necessity and a nicety.

Students will be able to design an emergency kit to serve a particular function.

Students will be able to explain and defend their choices for their emergency preparation kits.

Next Generation Science Standards

Engineering Design **Grades 3-5:** 3-ESS3-1, 4-ESS3-2, ESS3.B, 3-5-ETS1-1, 2

Grades 6-8: MS-ETS1-1, 2

Common Core ELA Standards

Listening and Speaking **Grade 3:** 1.7, 8

Speaking Applications **Grade 3:** 2.1 **Grade 4:** 2.2 a, b **Grade 5:** 2.2 a, b, c

California State Science Standards

Earth Science **Grade 6:** 2d

Vocabulary

Familiarity with these terms and concepts will enhance students' experience in the activity.

- **Earthquake:** A shaking of the ground caused by the sudden movement of the earth's tectonic plates or by volcanic activity.
- **Emergency Preparation Kit:** A kit, box, or bag that has supplies for an emergency or a situation that requires immediate medical attention.
- **Structures:** A manmade space such as a building or a bridge.
- **Electricity:** A form of energy from the movement of charged particles.
- **Sewage:** Waste water and drainage from buildings, homes, and communities.

Materials (one set per group of 4 students)

- (Optional) Devices with internet capabilities
- Whiteboard or notepad and markers (1 for the whole class)
- Poster board
- Markers and pencils
- Situation cards

Teaching points:

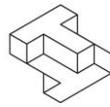
1. Summarize and review the earthquake lab.
 - a. What are the types of earthquakes?
 - b. What are the most stable shapes for building structures that can withstand earthquakes?
2. **QUESTIONS:** What happens to people after an earthquake? What if a person's home loses electricity or their house isn't safe enough for them to go back inside, then where do they go?
3. **INTRODUCTION:** This activity will be done in groups of four. Each group will be responsible for designing an emergency kit for a specific situation that requires a person to evacuate their home for 72 hours. Every team will be required to make a poster to show what should be in an emergency preparation kit.

Procedure:

4. On the board create 2 columns:
 - a. What damage can be done by an earthquake?

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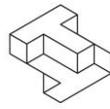
- b. What items are day-to-day necessities? (This question is vague to allow students to think about necessities and niceties).
5. Have students do a think/pair/share about these questions. Record their answers in the columns.

CONVERSATION GUIDES:

- a. If they are having problems getting started you could ask if any of them have gone camping or for a hike. What did they need on those trips?
 - b. If there is no electricity what won't work in a house anymore?
Refrigerator, phone and game chargers, no television, no lights
 - c. What things are in or on the ground that could be affected?
Roads, water pipes, sewage pipes, electricity in some places.
 - d. Are there items on our "what things are necessary" list that are nice to have but not really necessities?
6. (Optional) If the class wants to spend more time practicing how to prepare for emergencies, then DHS and FEMA have created Ready.gov to help with preparation and materials. The information is available in 13 languages.
- a. Ready.gov for Kids. <http://www.ready.gov/kids/games> has games for preparation for different types of disasters and a game for identifying what is a necessity for an emergency kit.
 - b. Ready.gov for Educators. www.ready.gov/kids/educators has a number of activities and additional lesson plans that can be used in the classroom.
 - c. Red Cross also has a list of suggested items for an emergency preparation kit:
<http://www.redcross.org/get-help/prepare-for-emergencies/be-red-cross-ready/get-a-kit>
7. Each team will make a poster on what should be in an emergency kit for various situations and share it with the class, then display it in the hallway. Consider giving the whole class one scenario or a different scenario to each team.
- a. *Situation One:*
An elderly person is home alone in their apartment when an earthquake hits. After the initial earthquake the person is scared but physically okay and is told to evacuate the building.
Challenge: What do you think should be in this person's emergency backpack for 72 hours? How do you think an elderly person's emergency kit may differ from a family's or a young person's?
 - *Non-perishable food, water, any medicine he or she takes, emergency contact numbers, blanket, change of clothes, toothbrush, etc.*
 - b. *Situation Two:*
A family of four (two parents, one child age 6, one child age 8 months) is at home playing with their two dogs when a medium-high impact earthquake (6.4) hits. The news reports that their neighborhood will need to evacuate for a few days as government officials verify everything is safe and there isn't a gas leak. They have 15 minutes to grab some items and evacuate their neighborhood.
Challenge: What do you think this family should grab before evacuating? Should any of these items have already been packed in an Emergency Kit?
 - *Non-perishable food (for the dogs too), baby formula, water, any medicines the family takes, diapers, blankets, radio, flashlight, extra batteries, first aid kit, etc.*
 - c. *Situation Three:*
Our classroom works together as a team to make sure we are all safe. Earthquakes and other emergencies don't only happen when we are at home; we need a classroom kit that we can take with us if we ever need to evacuate. We have lots of time to plan, but the kit will need to be light enough that the teacher can carry it out of the classroom.
Challenge: What do you think we need as a classroom if we need to evacuate our classroom for four hours? How would our kit be different than one you might have at home?
 - *Roll sheet, first-aid kit, any student medications, snacks, sunblock, etc.*
 - d. *Situation Four:*
A family of five (three kids age 12, 9, and 7) is very busy and are frequently driving back and forth from different sports, school, after school activities, and weekend adventures around the Bay Area. They have

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noticed that there are things they tend to need when out on the road that they frequently forget to pack. Challenge: What are things that could be in a kit in a car to be prepared for a wide range of needs from minor emergency (scraped knees) to major emergency (flat tire in the middle of nowhere)? What would make this kit different than other emergency kits?

- *Blankets, food, water, flashlight, radio, first-aid kit, road flares, emergency car kit, etc.*

8. Have students share their projects with the class and explain why they chose these things for their kits.

Teaching Points:

9. DISCUSSION QUESTIONS:

- What did our kits have in common? What was different?
- Explain why it is important to create an emergency kit
- What are other situations where a preparation kit would be useful? Should we only prepare for emergencies?
- How can we help people who have experienced an emergency or disaster where they live?

Taking it Further

- Create a fundraiser to raise money for an organization that provides disaster relief. Consider [UNICEF](#) or the [American Red Cross](#).
- Create a topographical map that show the interaction of geosphere, biosphere, hydrosphere, and atmosphere. Demonstrate or illustrate what happens to these when there is an earthquake.
- Research a product developed that can help during an emergency situation and learn about how it works.
 - [LifeStraw](#)
 - [Space Blanket](#)
 - [MRE](#)
 - [Hot and cold packs](#) (These reactions are discussed in Chemicals of Innovation Lab at The Tech Museum)
 - [Faraday flashlights](#)
- Research an earthquake and the recovery efforts, looking specifically for: how people, communities, and countries came together to solve problems. Consider one of the following:
 - 2010 Haiti earthquake
 - 2011 Japan earthquake and tsunami
 - 2017 Central Italy earthquake